CHAPTER 4
FUEL SYSTEM/CARBURETION

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JETTING GUIDELINES

Changes in altitude and temperature affect air density, which is essentially the amount of oxygen available for combustion. In low elevations and cold temperatures, the air has more oxygen. In higher elevations and higher temperatures, the air is less dense.

Carburetors are calibrated for an altitude of 0-3000 ft. (0-900 meters) and ambient temperatures between +40 and +80° F (+5° to +26° C). Carburetors must be re-calibrated if operated outside the production temperature and/or altitude range. The main jet installed in production is not correct for all altitudes and/or temperatures. In addition, air screw / pilot screw adjustments may be required to suit operating conditions.

CAUTION:

A main jet that is too small will cause a lean operating condition and may cause serious engine damage. Select the correct main jet carefully for elevation and temperature according to the charts in the General/ Specifications Chapter, or in the Owner's Safety and Maintenance Manual for each particular model.

MAIN JET SELECTION

IMPORTANT: The following guidelines must be followed when establishing a main jet setting:

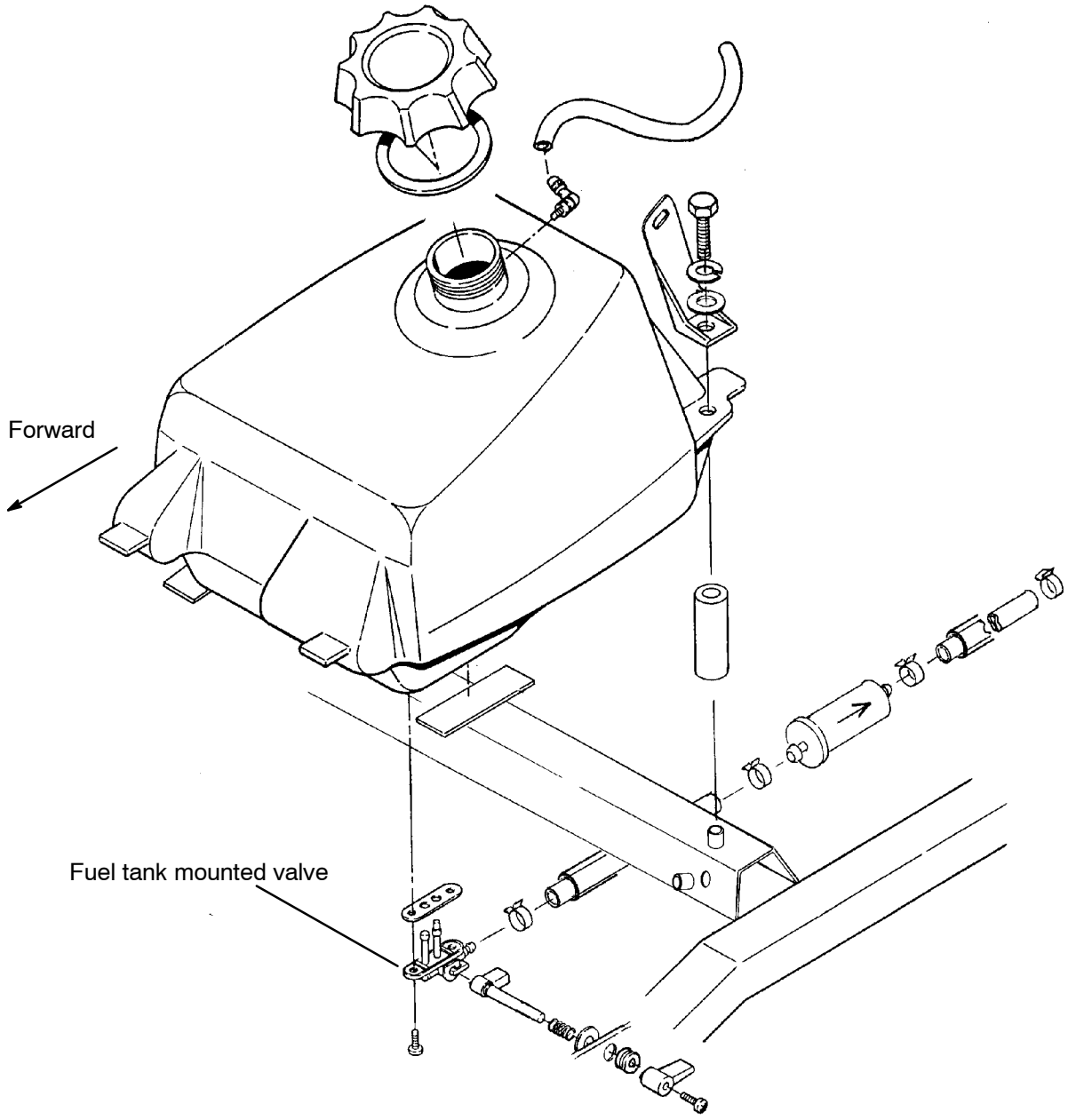
1. Select the lowest anticipated temperature at which the machine will be operated.
2. Determine the lowest approximate altitude at which the machine will be operated.
3. Select the correct main jet from the chart.
4. Clutching changes may also be required for changes in elevation. Refer to clutching charts in General / Specifications Chapter 1 for recommendations.

⚠ WARNING

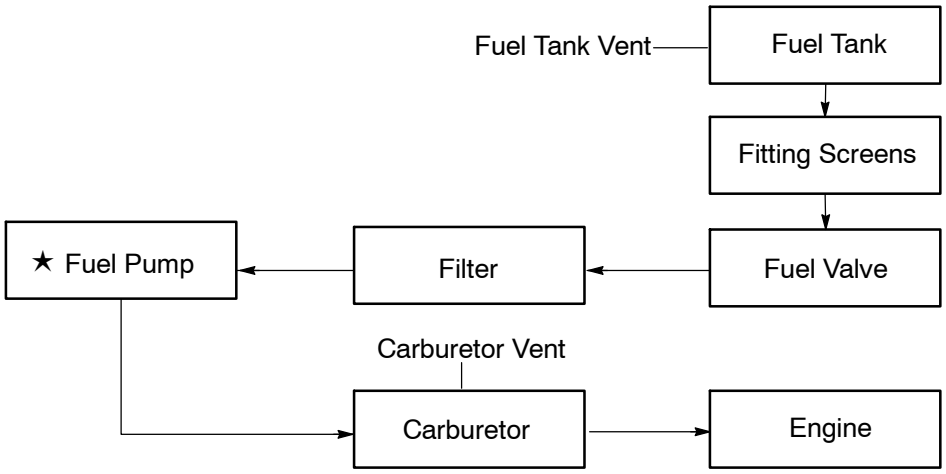
Gasoline is extremely flammable and explosive under certain conditions.

- Always stop the engine and refuel outdoors or in a well ventilated area.
- Do not overfill the tank. Do not fill the tank neck.
- Never start the engine or let it run in an enclosed area. Gasoline powered engine exhaust fumes are poisonous and can cause loss of consciousness and death in a short time.
- Never drain the float bowl when the engine is hot. Severe burns may result.
- Do not smoke or allow open flames or sparks in or near the area where refueling is performed or where gasoline is stored.
- If you get gasoline in your eyes or if you should swallow gasoline, see your doctor immediately.
- If you spill gasoline on your skin or clothing, immediately wash it off with soap and water and change clothing.

FUEL TANK ASSEMBLY



FUEL FLOW DIAGRAM



★ Located Above Oil Tank

MIKUNI JET PART NUMBERS

Main Jet Part Numbers
Mikuni BST Carburetor

Jet Number	Part Number
112.5	3130554
115	3130555
117.5	3130556
120	3130557
122.5	3130558
125	3130559
127.5	3130560
130	3130561
132.5	3130562
135	3130563
137.5	3130564
140	3130527
142.5	3130566
145	3130567
147.5	3130568
150	3130569
152.5	3130570
155	3130571
157.5	3130572
160	3131141
162.5	3131142
165	3131143
167.5	3131144
170	3131145

Pilot Jet Part Numbers
Mikuni BST Carburetor

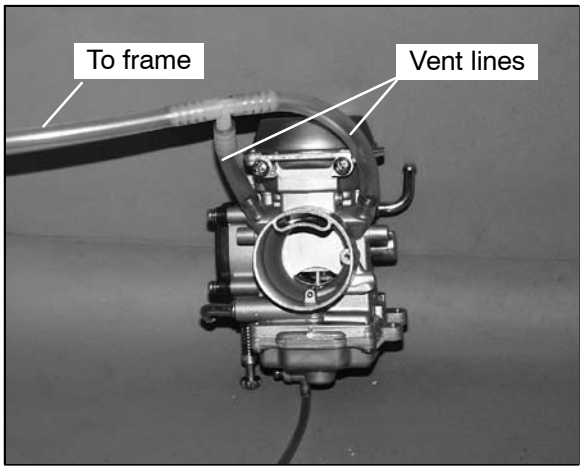
Jet Number	Part Number
40.0	3130624
42.5	3130526

CV CARBURETOR SYSTEM FUNCTION

Carburetor Component Function			
System	**Main Components**	**Main Function**	**Main Affect**
Float System (Fuel Level Control)	Inlet Pipe, Needle and Seat, Float, Float Pin	Maintains specified fuel level in float chamber (carburetor float bowl)	All systems All throttle ranges
Venting	Vent Passages in Carburetor, Vent lines (2) into (1) to frame	Supplies atmospheric pressure to fuel in float chamber	All systems All throttle ranges
Starter (Choke/Enrichment)	Choke Lever, Cable, Choke Plunger, Return Spring, Carb Passages (Starter Jet, Starter Bleed Pipe)	Supplies additional fuel air mixture necessary for cold starting	All throttle ranges Greatest effect at low throttle settings and idle
Pilot (Idle System)	Pilot Jet/Passageways, Pilot-Mixture Screw with Spring Washer and Sealing O-Ring, Bypass Ports (Behind Throttle Plate), Pilot Air Jet, Pilot Outlet, Throttle Plate	Primarily supplies fuel at idle and low throttle settings	Mainly idle to 1/4 throttle Minimal effect after 1/2 throttle
Main System	Main Jet, Main Air Jet, Main Air Passage, Needle Jet, Jet Needle, Vacuum Slide, Throttle Plate	Supplies fuel at mid-range and high throttle settings.	1/4 to full throttle

VENT SYSTEMS - CV CARBURETOR

The carburetor float bowl vent lines supply atmospheric pressure to the fuel in the float bowl. The lines must be free of kinks and restrictions and be properly routed to allow fuel to flow in the proper amount and to prevent contaminants from entering the carburetor.

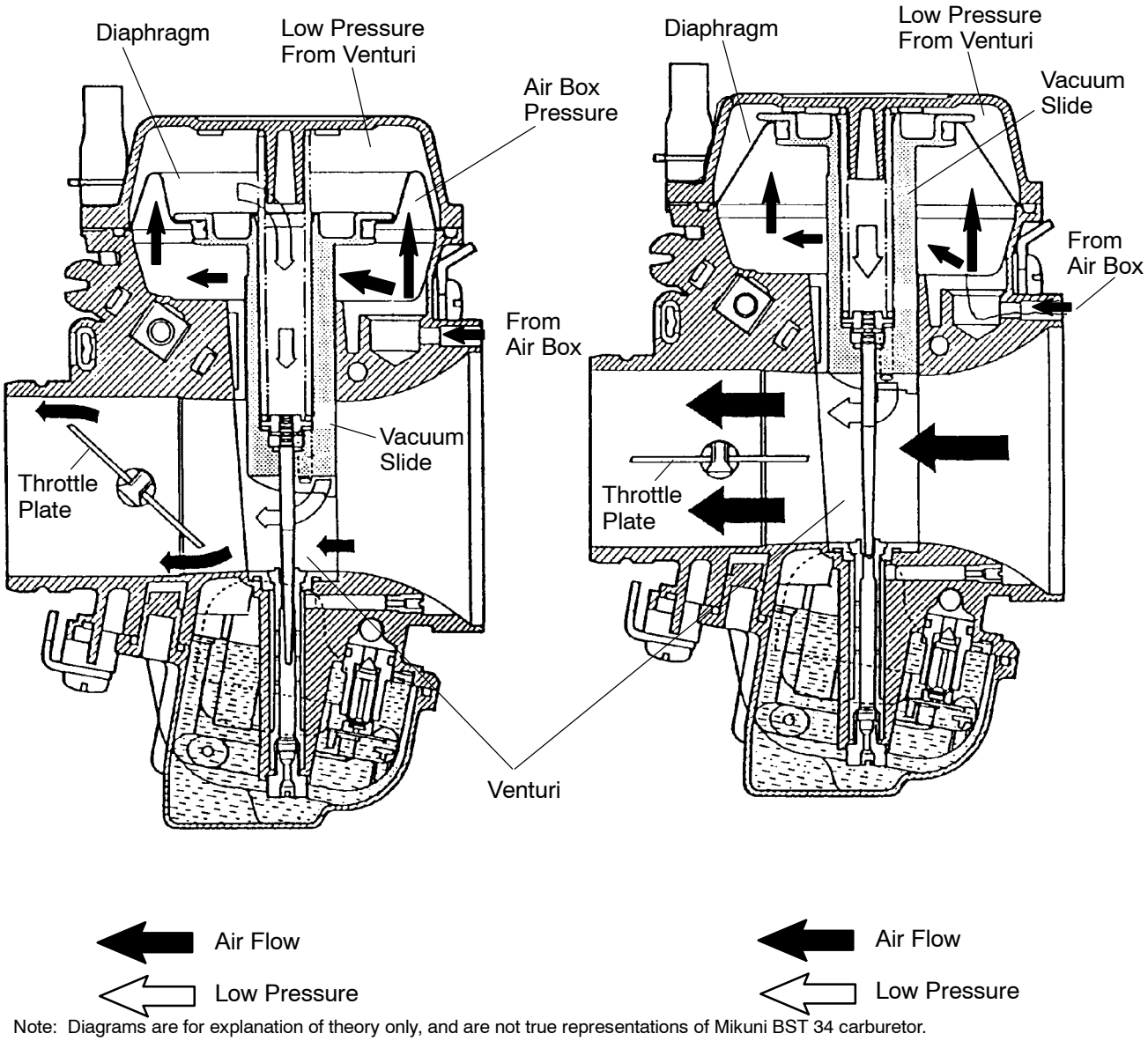


MIKUNI CV CARB OPERATION

The constant velocity carburetor incorporates a mechanically operated throttle plate and a vacuum controlled slide valve (vacuum slide). The venturi cross-sectional area in the carburetor bore is increased or decreased automatically by the vacuum slide, which moves according to the amount of negative pressure (less than atmospheric) present in the venturi.

A diaphragm attached to the top of the vacuum slide is sealed to the slide and to the carburetor body forming two chambers. The chamber above the diaphragm is connected to the venturi area by a drilled orifice in the center of the vacuum slide. The chamber below the diaphragm is vented to atmospheric pressure by a passage on the air box side of the carburetor. A spring, installed in the center of the vacuum slide, dampens the slide movement and assists the return of the slide.

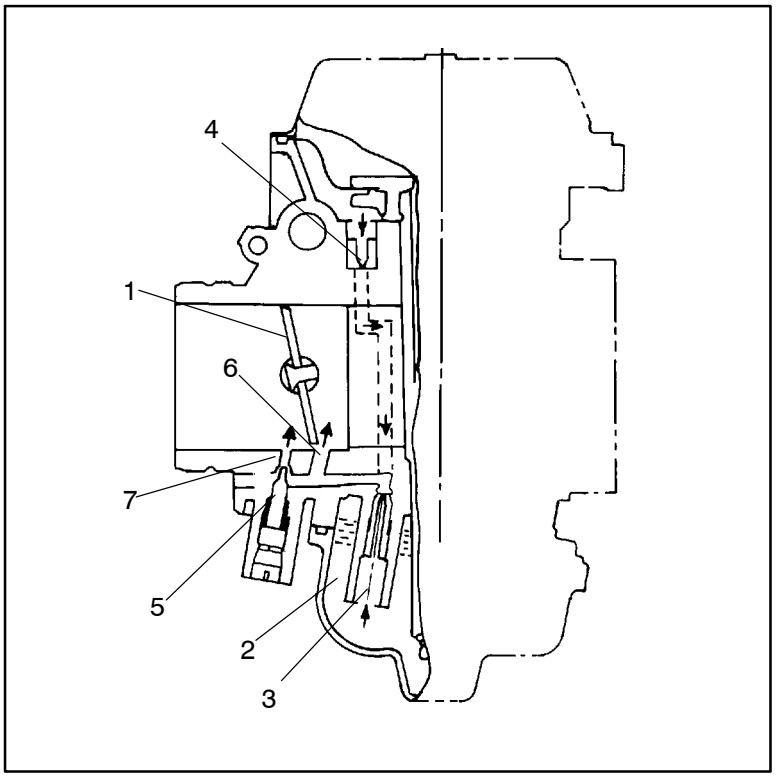
When the throttle plate is opened and engine speed begins to increase, the pressure in the venturi (and therefore in the chamber above the diaphragm) becomes significantly lower than atmospheric. Atmospheric pressure in the chamber below the diaphragm forces the diaphragm upward, raising the slide against spring pressure. When the pressure above and below the diaphragm are nearly equal, the slide moves downward under spring pressure. Raising or lowering the slide increases or decreases the cross sectional area in the venturi, and therefore the air velocity in the venturi is kept relatively constant. This provides improved fuel atomization and optimum fuel/air ratio.



Note: Diagrams are for explanation of theory only, and are not true representations of Mikuni BST 34 carburetor.

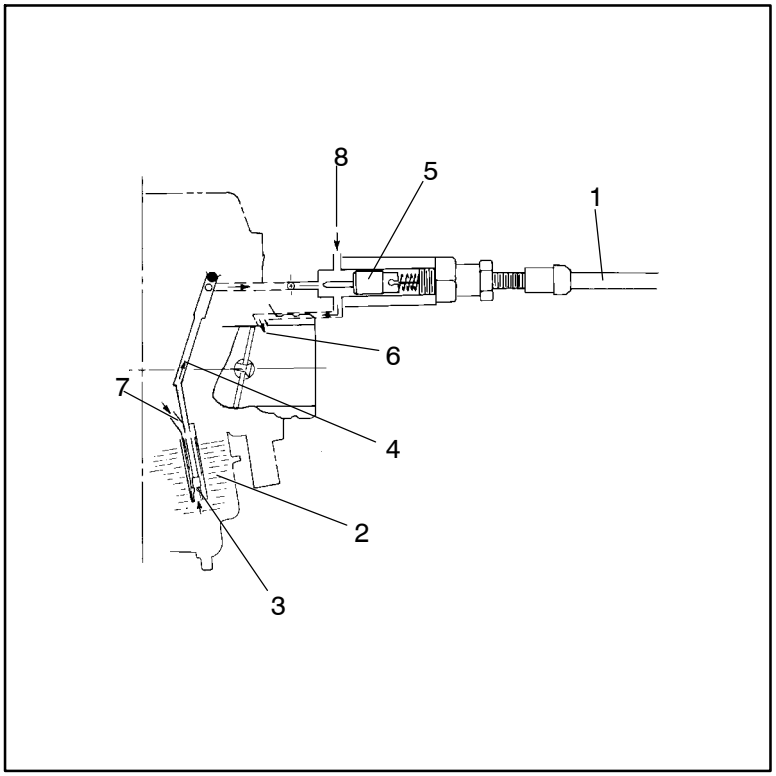
PILOT (IDLE AND SLOW) SYSTEM

This system supplies fuel during engine operation with throttle valve closed (1) or slightly opened. The fuel from float chamber (2) is metered by pilot jet (3) where it mixes with air coming in through pilot air jet (4). The mixture then goes up through pilot passage to pilot screw (5). A part of the mixture is discharged into the main bore out of bypass ports (6). The remainder is then metered by pilot screw and discharged into the main bore through pilot outlet (7).



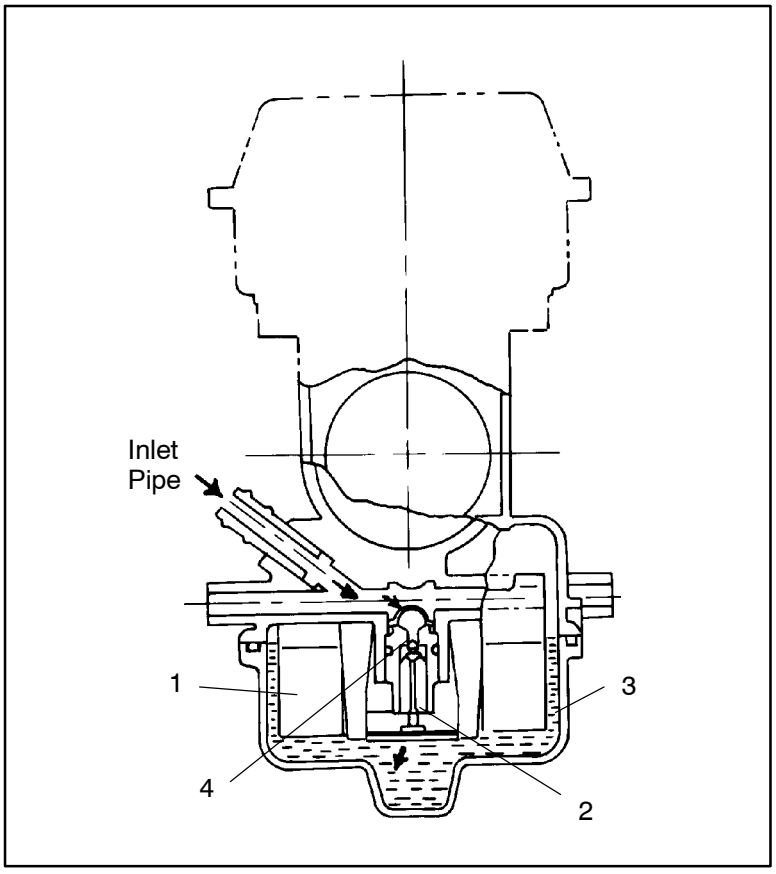
STARTER SYSTEM (CHOKE OR ENRICHMENT)

When the choke cable (1) is activated, the starter plunger (5) is lifted off the seat. Fuel is drawn into the starter circuit from the float chamber (2) through the starter jet (3). Starter jet meters this fuel, which then flows into starter pipe (4) and mixes with the air (7) coming from the float chamber. The mixture, rich in fuel content, reaches starter plunger and mixes again with the air coming through a passage (8) extending from underneath the diaphragm. The rich fuel/air mixture for starting is discharged through starter outlet (6) in the the main bore.



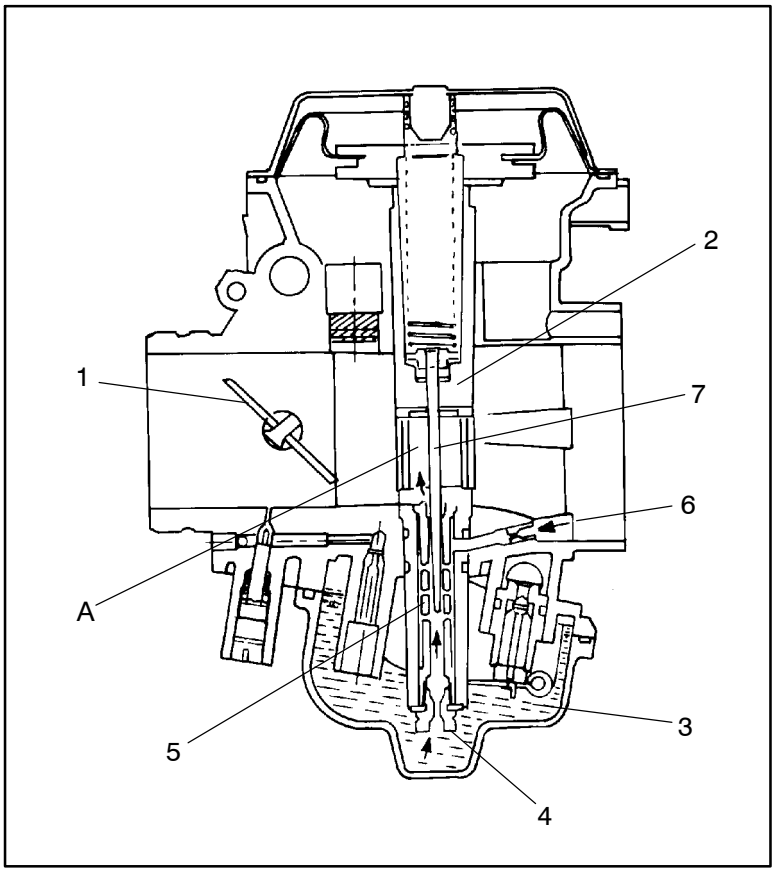
FLOAT SYSTEM

Fuel enters the float chamber (3) by means of the inlet pipe and passage, through a screen on the back of the inlet needle seat (4), and around the inlet needle (2). As the fuel fills the float chamber, the float (1) rises and forces the inlet needle against the seat, shutting off the orifice in the seat. When fuel level is up in float chamber, floats are up and needle valve remains pushed up against valve seat. Under this condition, no fuel enters the float chamber. As the fuel level falls, floats go down and needle valve unseats itself to admit fuel into the chamber. In this manner, the needle valve admits and shuts off fuel alternately to maintain a practically constant fuel level inside the float chamber.

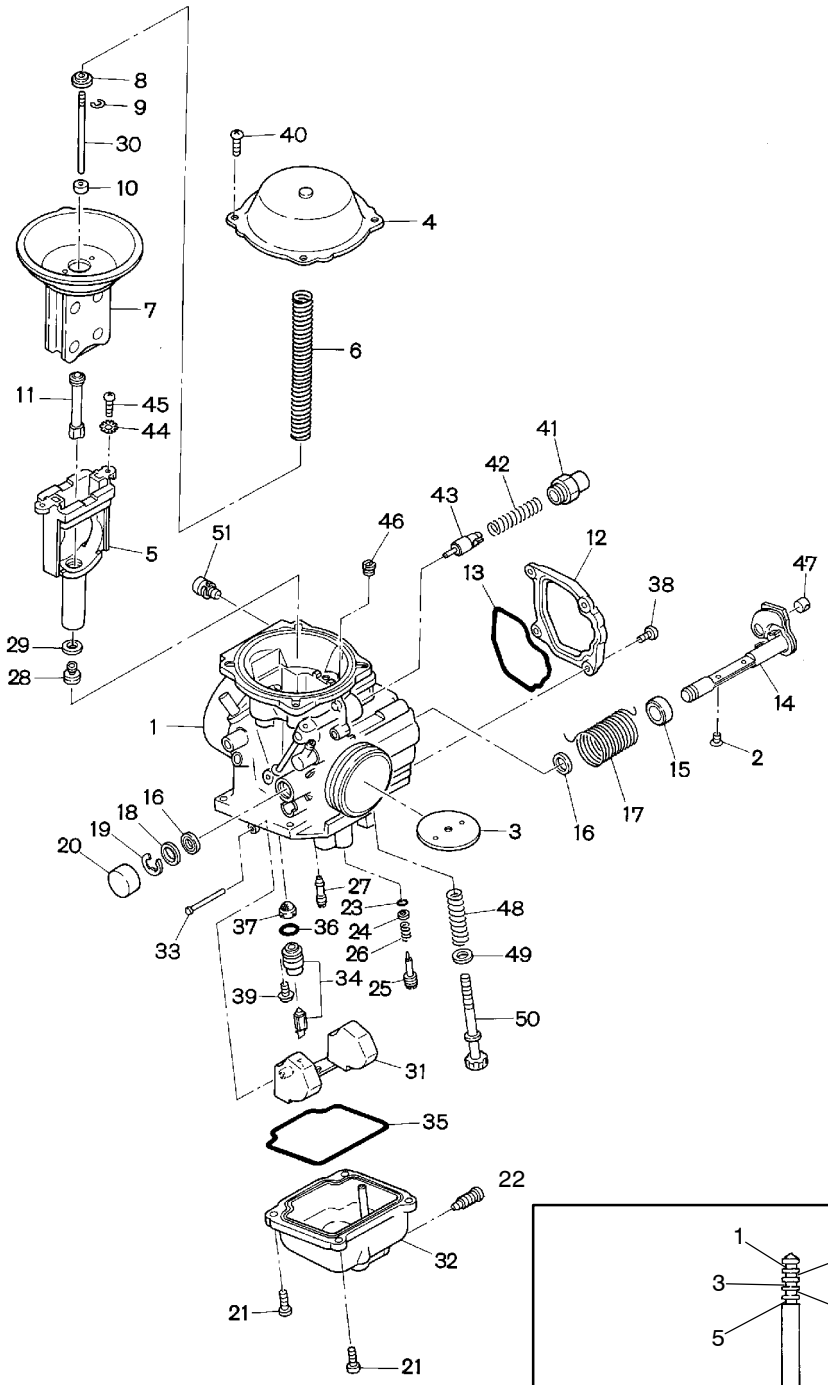


MAIN SYSTEM

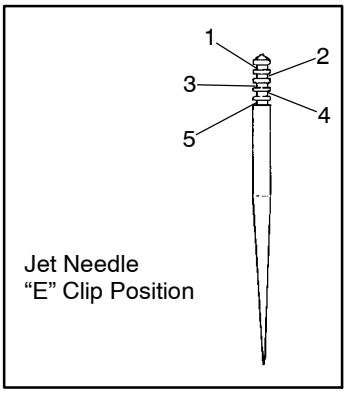
As throttle valve (1) is opened, engine speed rises, and this increases negative pressure in the venturi. Consequently the vacuum slide (2) moves upward. The fuel in float chamber (3) is metered by main jet (4), and the metered fuel enters needle jet (5), in which it mixes with the air admitted through main air jet (6) to form an emulsion. The emulsified fuel then passes through the clearance between needle jet (5) and jet needle (7), and is discharged into the venturi (A). Mixture proportioning is accomplished in needle jet (5); the clearance through which the emulsified fuel must flow is determined ultimately by throttle position and vacuum slide height.



BST 34 CARBURETOR EXPLODED VIEW



Refer to Page 4.4 for Jet Part Numbers



Jet Needle
"E" Clip Position

1. Carburetor Assembly
2. Screw
3. Throttle Valve
4. Cover, Diaphragm
5. Jet Block Assembly
6. Spring
7. Diaphragm Assembly
8. Ring
9. "E" Ring
10. Ring
11. Needle Jet
12. Cover
13. O-Ring
14. Throttle Shaft Assembly
15. Ring
16. Seal
17. Spring
18. Packing
19. "E" Ring
20. Cap
21. Screw
22. Drain Screw
23. O-Ring
24. Washer
25. Adjuster
26. Spring
27. Pilot Jet
28. Main Jet
29. Washer
30. Jet Needle
31. Float Assembly
32. Float Body Assembly
33. Float Pin
34. Needle Valve
35. O-Ring
36. O-Ring
37. Filter
38. Screw
39. Screw
40. Screw
41. Guide Holder
42. Spring
43. Plunger Assembly
44. Spring Washer
45. Screw
46. Air Jet
47. Cable Guide
48. Spring
49. Ring
50. Adjust Screw
51. Screw and Washer Assy.

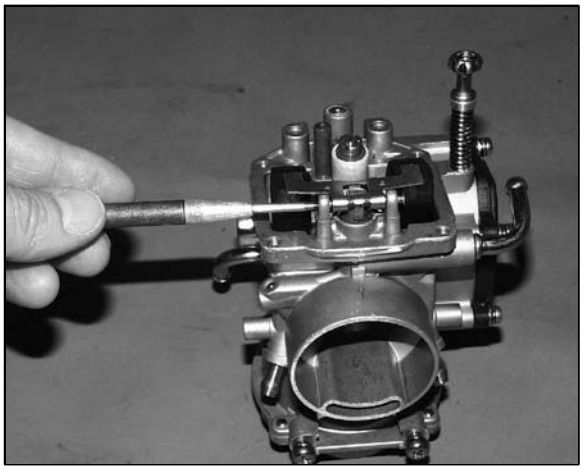
CARBURETOR DISASSEMBLY - MIKUNI CV

Use the following disassembly, assembly, and inspection techniques to service a CV carburetor.

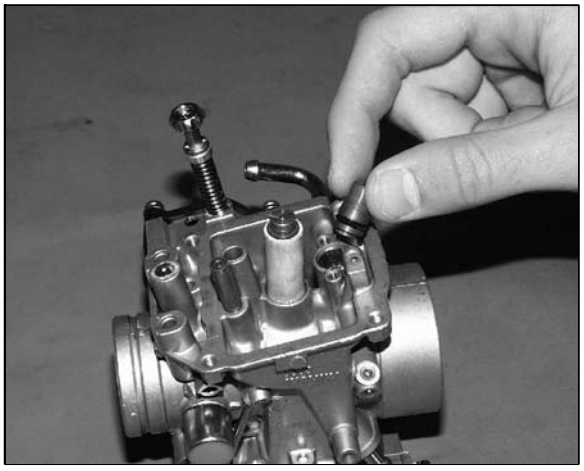
1. Remove carburetor diaphragm chamber cover with a ratchet style screwdriver. DO NOT use an impact driver to remove the screws or carburetor may be permanently damaged.

2. Use a small spring loaded center punch to remove pressed float pin.

NOTE: Set the center punch to the softest setting (if adjustable) to avoid damage to float pin tower.

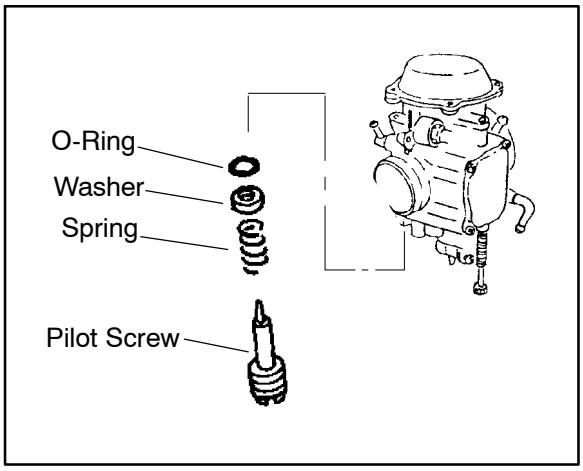


3. Remove inlet needle seat retaining screw along with plate, and carefully remove needle seat. **NOTE:** Do not use a pliers to remove the seat or permanent damage may occur.



CARBURETOR DISASSEMBLY - MIKUNI CV, CONT.

4. Do not misplace the pilot mixture screw, spring, flat washer, or O-Ring. If anti-tamper plug is installed in pilot screw cavity, refer to Maintenance chapter 2 for removal procedure.



5. **NOTE:** The starter jet is not removeable.

CARBURETOR CLEANING

1. Thoroughly clean the carburetor body, jets, and all passages with carburetor cleaner or electrical contact cleaner.

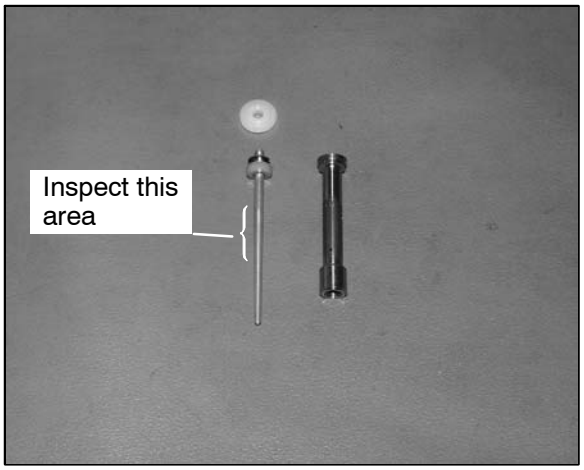
⚠ WARNING

Protect eyes from contact with cleaner. If you get cleaner in your eyes or if you swallow cleaner, see your doctor immediately. Some carburetor cleaners are extremely caustic and extended periods of soaking can loosen the adhesive sealer on the passage drill-way plugs. *Do not* soak rubber or plastic components (such as the vacuum slide diaphragm, needle seat screen, or O-Rings in caustic cleaning solutions. Irreparable damage may occur. Do not use agitator type carburetor cleaning equipment. Rubber parts must be cleaned with mild detergent and hot water only.

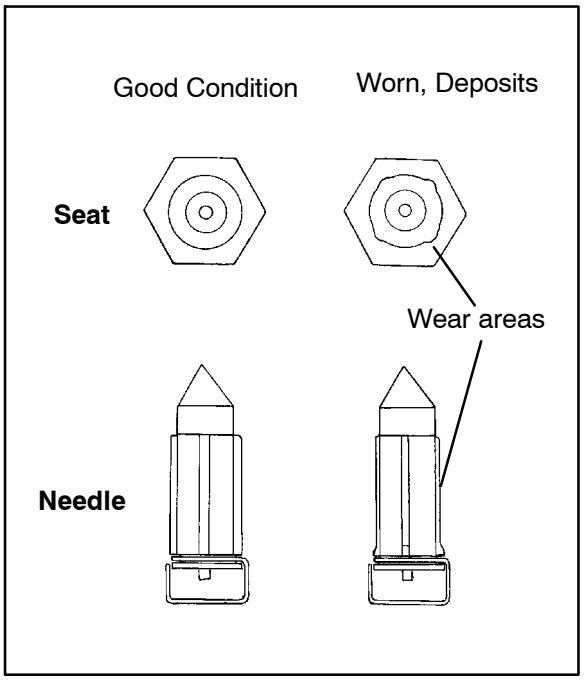
2. If the carburetor is extremely dirty or contaminated with fuel residue and varnish, soak for short periods only in carburetor cleaner, and rinse in hot water.
3. Replace the jets if they are extremely dirty or have a buildup of fuel residue or bacterial growth. Even a small amount of residue will reduce the flow characteristics of the jet.
4. Verify all passages and jets are unobstructed by spraying electrical contact cleaner through the passages. **CAUTION:** Do not use wire or welding tip cleaners on the jets as the orifice size may be altered.
5. Use low pressure air to dry carburetor body and all components.

CARBURETOR INSPECTION

1. Inspect jet needle and needle jet for wear. Look for discoloration, shiny spots, or and area that looks different than the rest of the needle. The middle to upper portion of the needle where it contacts the needle jet is the most likely wear point. If jet needle shows signs of wear replace both needle and needle jet to prevent a rich condition.



2. Inspect the inlet needle tapered surface for any sign of wear or damage. Be sure the spring loaded pin is free moving and returns freely when pushed. The inlet needle and seat should be pressure tested after assembly.

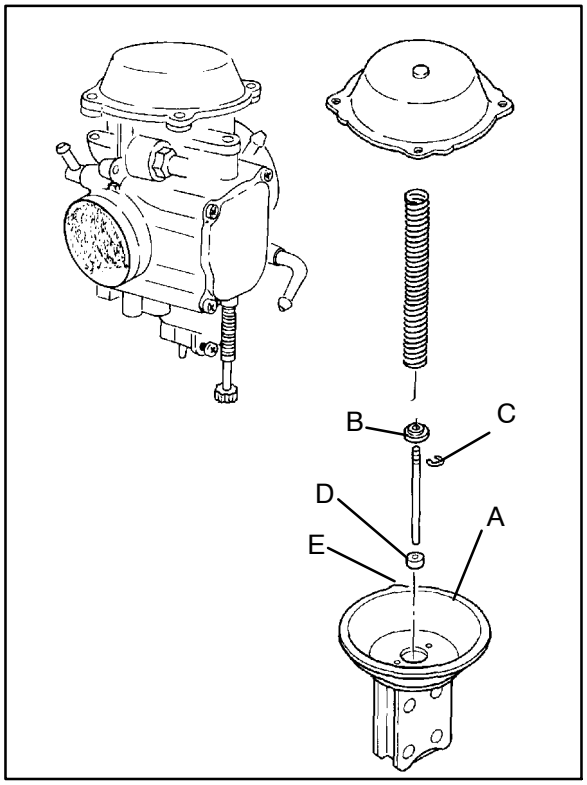


CARBURETOR ASSEMBLY

1. Inspect the diaphragm (A) for holes, deterioration, or damage. Make sure the diaphragm is pliable but not swollen. The diaphragm should fit properly in the carburetor body. Replace diaphragm assembly if diaphragm is damaged.

2. Replace parts in proper order. The spring seat washer (B) is stepped and must be placed on TOP of "E" Clip (C). Spacer washer (D) must be installed below the E-Clip. Refer to parts manual for more information.

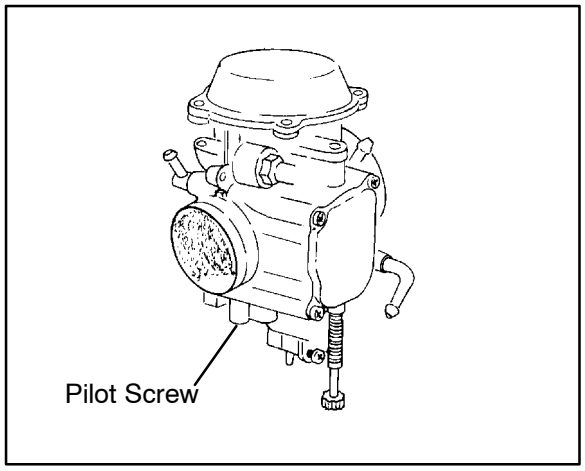
3. Be sure the tab (E) on outer edge of diaphragm is positioned properly in the carburetor body.



4. Install the pilot mixture screw, spring, washer, and O-ring as an assembly. Lubricate the O-Ring with oil or light grease before installation. **CAUTION:** Do not damage the O-ring during installation. Turn the screw in until it *lightly* contacts the seat. Back out the specified number of turns. NOTE: The final pilot (idle) mixture must be adjusted with the engine running. Refer to Page 2.13.

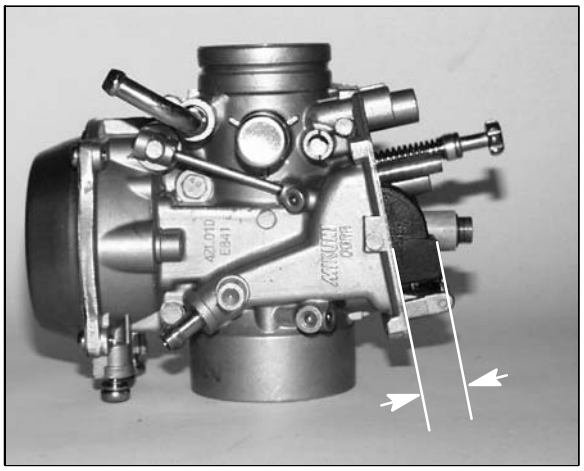
Pilot Mixture Screw Base Setting (Turns Out)

Refer to General / Specifications Chapter 1



FLOAT HEIGHT ADJUSTMENT

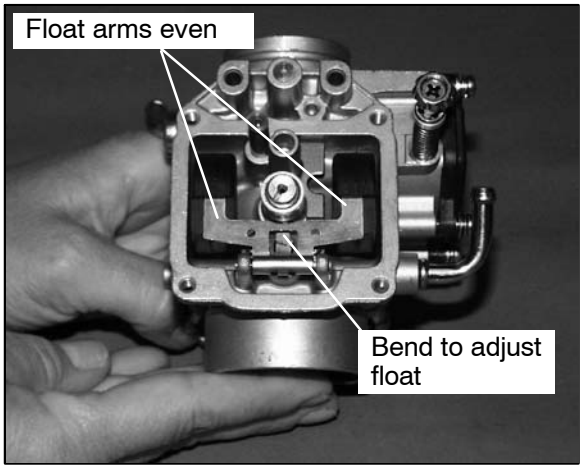
1. Place the carburetor on a level surface as shown at right to remove weight from float arm. In this position, the float tongue will rest lightly on the inlet needle valve pin without compressing the spring.
2. Measure the height from the float bowl mating surface to the top of step in float as shown. Both sides of float should be parallel to each other. The measurement should be made at the mid-point on the top of the float using float adjustment tool (PN 2872314) or a vernier caliper. When measuring the height be sure the inlet needle valve spring is not compressed.



Float Height:

Std: BST 34 14.7mm (.58″) ± 1 mm

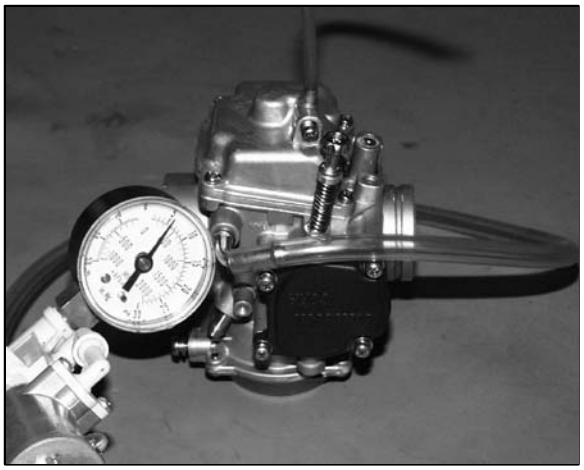
3. If adjustment is necessary, bend the tongue slightly. Be sure float arms are even on left and right side.



NEEDLE AND SEAT LEAKAGE TEST

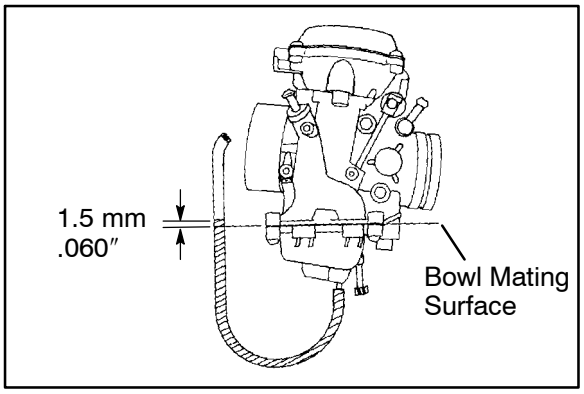
1. Install the float bowl. Invert the carburetor and install a Mity-Vac™ (PN 2870975) to the fuel inlet fitting. Apply 5 PSI pressure to inlet fitting. The needle and seat should hold pressure indefinitely. If not, inspect needle and seat and seat O-ring.

Mity Vac™ PN 2870975



FUEL LEVEL

A fuel level test can be performed on some models if the drain hose fitting is accessible. Be sure to re-attach the bowl drain hose after performing the test. A fuel level test allows you to observe the height of the fuel in the float bowl without removing the carburetor. The fuel level can be observed with the engine either running or shut off, however, engine must run briefly to allow fuel level to stabilize..



1. Attach a clear line to drain fitting. Be sure line fits tightly on fitting. Position hose along side of carburetor as shown.
2. Open bowl drain screw by turning counterclockwise approximately two turns. Start and run engine for 3 to 5 seconds to allow fuel level to stabilize in the line. If level is out of specification, remove carburetor and inspect inlet needle and seat, float height, passages, etc.
3. If a line was removed to perform this procedure, it must be replaced.

FUEL PUMP

The Polaris 6x6 is equipped with a pressure regulated fuel pump (about 1-3 PSI). The pump is located under the headlight cover at the front of the machine. Refer to illustration on following page for fuel pump component identification.

To test the fuel pump:

1. Turn fuel off.
2. Disconnect impulse line from pump.
3. Connect Mity-Vac™ (PN 2870975) to the impulse line fitting on the pump.
4. Apply 5 inches (Hg) vacuum to the pump fitting. The diaphragm should hold vacuum indefinitely.

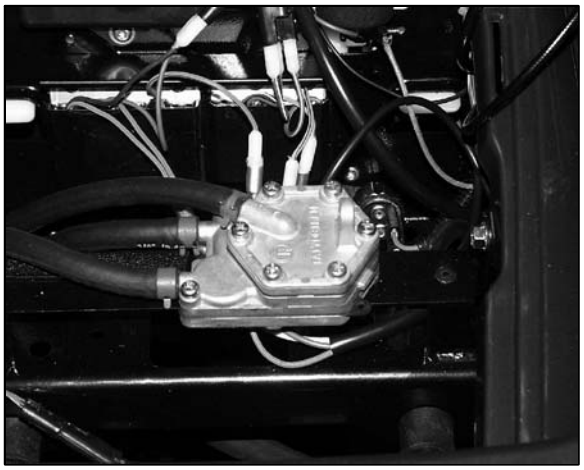
If fuel is present in the impulse line or vacuum chamber of the pump, the diaphragm is ruptured and the pump diaphragms must be replaced.

FUEL PUMP DISASSEMBLY

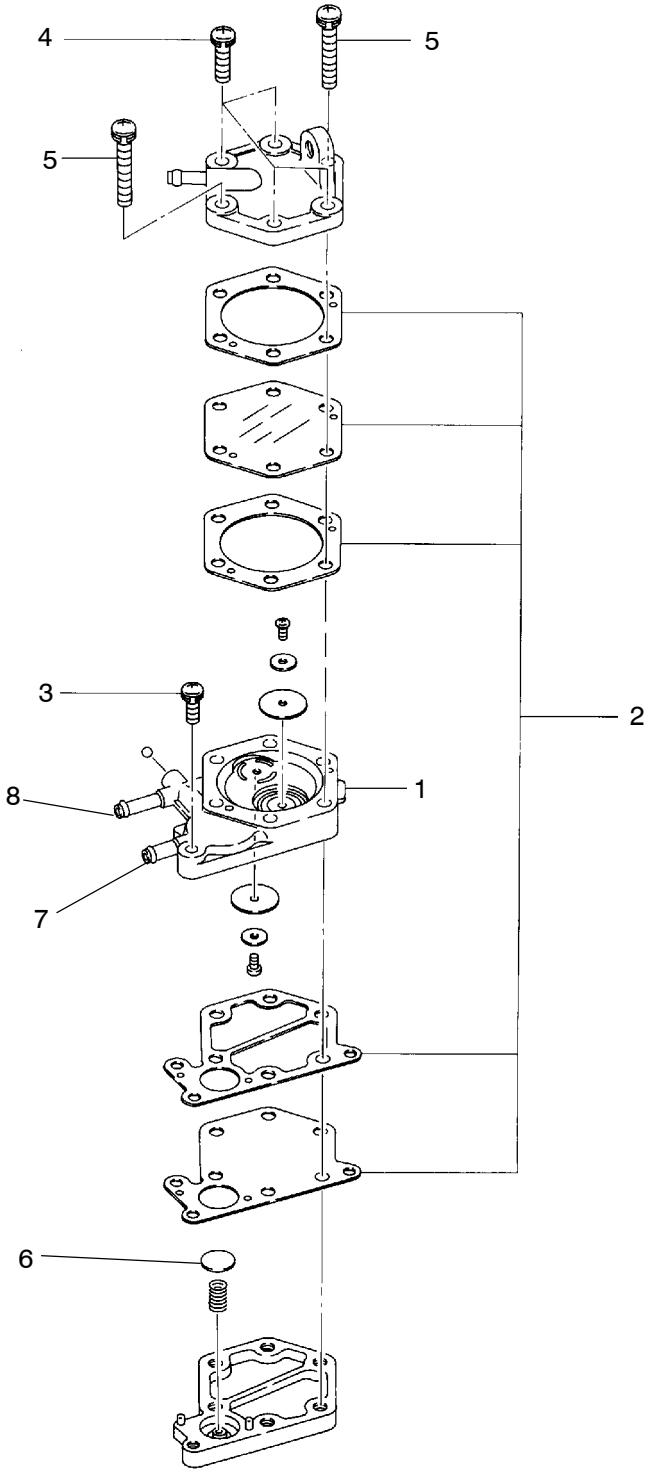
1. Refer to illustration on following.
2. Remove the screws from the pump diaphragm cover. Note the location of the two longer screws.
3. Remove the diaphragm cover gasket, diaphragm, and valve body gasket.
4. Remove the outlet check valve cover, diaphragm, and gasket.

FUEL PUMP INSPECTION/ASSEMBLY

1. Inspect inlet and outlet check valves for cracks, warpage or damage. Inspect the diaphragms for cracks, holes or swelling.
2. To clean the valves or pump body, remove the set screw and washer. Remove the valve and wash with soap and water. Carburetor cleaner may be used to clean the pump body when the check valves are removed. **CAUTION:** Some carburetor cleaners are very caustic and should not be used to clean the non-metal parts of the fuel pump.
3. Check the sealing surfaces of the pump body and covers. Carefully remove all traces of old gasket and check the surfaces for damage. Replace diaphragms and gaskets as a set.
4. Reassemble the pump in the reverse order of disassembly. Tighten all screws evenly.



FUEL PUMP EXPLODED VIEW



1. Fuel Pump Assembly
2. Diaphragm, Gasket Set
3. Screw and Washer Assembly
4. Screw and Washer Assembly
5. Screw and Washer Assembly
6. Pressure Regulator
7. Fuel Inlet
8. Fuel Outlet

TROUBLESHOOTING

Fuel Starvation/Lean Mixture

Symptoms: Hard start or no start, bog, backfire, popping through intake / exhaust, hesitation, detonation, low power, spark plug erosion, engine runs hot, surging, high idle, idle speed erratic.

- No fuel in tank
- Restricted tank vent, or routed improperly
- Fuel lines or fuel valve restricted
- Fuel filter plugged
- Carburetor vent line(s) restricted
- Plugged or restricted inlet needle and seat screen or inlet passage
- Clogged jets or passages
- Float stuck, holding inlet needle closed or inlet needle stuck
- Float level too low
- Fuel pump inoperative
- Air leak at impulse line
- Restricted impulse line (kinked, pinched)
- Intake air leak (throttle shaft, intake ducts, airbox or air cleaner cover)
- Ruptured vacuum slide diaphragm, Vacuum slide stuck closed or sticky
- Improper spring
- Jet needle position incorrect
- Incorrect pilot screw adjustment

Rich Mixture

Symptoms: Fouls spark plugs, black, sooty exhaust smoke, rough idle, poor fuel economy, engine runs rough/ misses, poor performance, bog, engine loads up, backfire.

- Air intake restricted (inspect intake duct)
- Air filter dirty/plugged
- Choke plunger sticking, incorrectly adjusted choke
- Choke cable binding or improperly routed
- Incorrect pilot air/fuel screw adjustment
- Faulty inlet needle and seat
- Faulty inlet needle seat O-Ring
- Float level too high
- Poor fuel quality (old fuel)
- Loose jets
- Worn jet needle/needle jet or other carburetor parts
- Dirty carburetor (air bleed passages or jets)
- Weak or damaged vacuum piston return spring
- Fouled spark plug

Poor Idle

Symptoms: Idle too high.

- Idle adjusted improperly/idle mixture screw damaged
- Sticky vacuum slide
- Throttle cable sticking, improperly adjusted, routed incorrectly
- Choke cable sticking, improperly adjusted, routed incorrectly

TROUBLESHOOTING, CONT.

Idle Too Low

- Choke cable bending or incorrectly adjusted
- Idle speed set incorrectly
- Idle mixture screw misadjusted or damaged
- Belt dragging
- Ignition timing incorrect
- Worn jet needle/needle jet

Erratic Idle

- Choke cable bending or incorrectly adjusted
- Throttle cable incorrectly adjusted
- Air leaks, dirty carburetor passages (pilot circuit)
- Pilot mixture screw damaged or adjusted incorrectly
- Tight valves
- Ignition timing incorrect
- Belt dragging
- Dirty air cleaner
- Engine worn
- Spark plug fouled
- Idle speed set incorrectly (speed limiter)
- Worn jet needle/needle jet

NOTES